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⁹ *Paris, C. R., Acad. Sci.*, **163**, 1914, (428).

¹⁰ *Ann. Physik., Leipzig*, **29**, 1909, (833).

¹¹ *Astroph. J., Chicago, Ill.*, **39**, 1914, (189).

THE EFFECT OF OXYGEN TENSION ON THE METABOLISM OF CASSIOPEA

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It was shown by Verzář (*J. Physiol.*, **45**, 1912, 39) that decreased oxygen tension in the blood capillaries decreased the metabolism of muscle but not of salivary glands. The animal died before the oxygen tension in the salivary glands was reduced sufficiently to cause a noticeable fall in metabolism. In order to avoid complications in circulation, as in Verzář's experiments, I used the umbrella of Cassiopea in such a manner as to maintain a thin layer of cells of uniform activity constantly bathed with sea water at 30°. It had been determined in preliminary experiments that a rise of 10° in temperature doubled the metabolism, but that the hydrogen ion concentration could be changed within certain limits without changing the metabolism to a degree that could be measured with certainty. The average of a large number of determinations placed the respiratory quotient at 0.95, but whether it was constant could not be determined. From the heat produced and nitrogen lost it was concluded that proteins with a small admixture of carbohydrates and fats were burned.

Since the temperature was constant, the oxygen-tension was proportional to the O₂-concentration, as determined by the Winkler method, the mean of the values at the beginning and end of the experiment being used. The metabolism was measured by the oxygen used, as that was determined more accurately than the heat and CO₂ eliminated. *The metabolism varied with oxygen concentration.* This may be true of the cells of all animals. It seems possible that Verzář did not succeed in markedly changing the O₂-tension in the salivary gland, owing to the great store of oxygen in the hemoglobin. There is, however, a distinction between the metabolism of vertebrate muscle cells and Cassiopea. If vertebrates are asphyxiated, the muscles give out lactic acid. A Cassiopea may remain without oxygen for seven hours without giving out CO₂ or any other acid causing a noticeable change in hydrogen ion concentration, although in the presence of O₂ such a change appears in

a few minutes due to elimination of CO_2 . After seven hours without O_2 , nerve conduction and noticeable contractility of muscle returns in thirty seconds after suspending the *Cassiopea* in air.

Since O_2 -tension may affect metabolism, it seems probable that changes in the threshold of stimulation of the respiratory and vasomotor centers may affect metabolism in man and mammals. The details of the experiments will be published elsewhere.